

## WE CLAIM:

1. A method for the production of 1,2,3,4-tetrahydroxybenzene and derivatives thereof from a carbon source, comprising the steps of:
  - a) converting the carbon source to *myo*-inositol with a first recombinant  
5 microbe;
  - b) converting the *myo*-inositol to *myo*-2-inosose with a second microbe;  
and
  - c) converting the *myo*-2-inosose to 1,2,3,4-tetrahydroxybenzene by acid  
catalyzed dehydration.
- 10 2. The method of Claim 1, wherein the first recombinant microbe  
comprises the gene encoding *myo*-inositol-1-phosphate synthase.
3. The method of Claim 2, wherein the gene encoding *myo*-inositol-1-  
phosphate synthase is a *S. cerevisiae* *INO1* gene.
4. The method of Claim 3, wherein the *S. cerevisiae* *INO1* gene is  
15 located on a plasmid in the recombinant microbe.
5. The method of Claim 4, wherein the plasmid is pAD1.88A.
6. The method of Claim 1, wherein the first recombinant microbe is *E.*  
*coli* JWF1/pAD1.88A.
7. The method of Claim 1, wherein the second microbe expresses  
20 inositol dehydrogenase activity.
8. The method of Claim 1, wherein the second microbe is *Gluconobacter*  
*oxydans*.
9. The method of Claim 8, wherein the *Gluconobacter oxydans* is  
*Gluconobacter oxydans* ATCC 621.
- 25 10. The method of Claim 1, wherein the second microbe is a recombinant  
microbe comprising the gene for inositol dehydrogenase.

- 25 -

11. The method of Claim 10, wherein the gene for inositol dehydrogenase is a *Bacillus subtilis iolG* gene.
12. The method of Claim 1, wherein the carbon source is glucose.
13. The method of Claim 1, further comprising the step of reducing the  
5 1,2,3,-tetrahydroxybenzene to 1,2,3-trihydroxybenzene.
14. A method of producing 1,2,3,4-tetrahydroxybenzene and derivatives thereof from a carbon source comprising the steps of:
- a) converting the carbon source to *myo*-inositol with a recombinant *E. coli* comprising the gene encoding *myo*-inositol-1-phosphate synthase;
  - 10 b) converting the *myo*-inositol to *myo*-2-inosose with a microbe that expresses inositol dehydrogenase activity; and
  - c) converting the *myo*-2-inosose to 1,2,3,4-tetrahydroxybenzene by acid catalyzed dehydration.
15. The method of Claim 14, wherein the gene encoding *myo*-inositol-1-phosphate synthase is the *S. cerevisiae INO1* gene.
16. The method of Claim 15, wherein the *INO1* gene is located on a plasmid in the recombinant *E. coli*.
17. The method of Claim 16, wherein the plasmid is pAD1.88A.
18. The method of Claim 14, wherein the recombinant *E. coli* is *E. coli*  
20 JWF1/pAD1.88A.
19. The method of Claim 14, wherein the carbon source is glucose.

- 26 -

20. A method for the production of 1,2,3,4-tetrahydroxybenzene and derivatives thereof from a carbon source, comprising the steps of:

- a) converting the carbon source to *myo*-2-inosose with a recombinant microbe; and
- 5 b) converting the *myo*-2-inosose to 1,2,3,4-tetrahydroxybenzene by acid catalyzed dehydration.

21. The method of Claim 20, wherein the recombinant microbe comprises the genes encoding for *myo*-inositol-1-phosphate synthase and inositol dehydrogenase.

10 22. The method of Claim 21, wherein the gene encoding for *myo*-inositol-1-phosphate synthase is a *Saccharomyces cerevisiae* INO1 gene.

23. The method of Claim 22, wherein the INO1 gene is located on a plasmid in the recombinant microbe.

24. The method of Claim 23, wherein the plasmid is pAD2.28A.

15 25. The method of Claim 21, wherein the gene encoding for inositol dehydrogenase is an *iolG* gene.

26. The method of Claim 25, wherein the *iolG* gene is a *Bacillus subtilis* *iolG* gene.

20 27. The method of Claim 25, wherein the *iolG* gene is located on a plasmid in the recombinant microbe.

28. The method of Claim 27, wherein the plasmid is pAD2.28A.

29. The method of Claim 20, wherein the recombinant microbe is JWF1/pAD2.28A.

- 27 -

30. A method of producing 1,2,3,4-tetrahydroxybenzene and derivatives thereof from a carbon source comprising the steps of:

- a) converting the carbon source to *myo*-2-inosose with a recombinant *E. coli* comprising the genes encoding for *myo*-1-phosphate synthase and inositol dehydrogenase; and
- b) converting the *myo*-2-inosose to 1,2,3,4-tetrahydroxybenzene by acid catalyzed dehydration.

31. The method of Claim 30, wherein the gene encoding for *myo*-inositol-1-phosphate synthase is the *S. cerevisiae INO1* gene.

32. The method of Claim 30, wherein the gene encoding for inositol dehydrogenase is the *Bacillus subtilis ioIG* gene.

33. The method of Claim 30, wherein the recombinant *E. coli* is JWF1/pAD2.28A.

34. A method for the production of 1,2,3-trihydroxybenzene and derivatives thereof from a carbon source, comprising the steps of:

- a) converting the carbon source to *myo*-inositol with a first recombinant microbe;
- b) converting the *myo*-inositol to *myo*-2-inosose with a second microbe;
- c) converting the *myo*-2-inosose to 1,2,3,4-tetrahydroxybenzene by acid catalyzed dehydration; and
- d) reducing the 1,2,3,4-tetrahydroxybenzene to 1,2,3-trihydroxybenzene.

35. The method of Claim 34, wherein the first recombinant microbe comprises the gene encoding *myo*-inositol-1-phosphate synthase.

36. The method of Claim 35, wherein the gene encoding *myo*-inositol-1-phosphate synthase is the *S. cerevisiae INO1* gene.

37. The method of Claim 36, wherein the *S. cerevisiae INO1* gene is located on a plasmid in the recombinant microbe.

- 28 -

38. The method of Claim 37, wherein the plasmid is pAD1.88A.

39. The method of Claim 34, wherein the first recombinant microbe is *E. coli* JWF1/pAD1.88A.

40. The method of Claim 34, wherein the second microbe expresses  
5 inositol dehydrogenase activity.

41. The method of Claim 34, wherein the second microbe is *Gluconobacter oxydans*.

42. The method of Claim 41, wherein the *Gluconobacter oxydans* is *Gluconobacter oxydans* ATCC 621.

10 43. The method of Claim 34, wherein the carbon source is glucose.

44. The method of Claim 34, wherein the 1,2,3,4-tetrahydroxybenzene is reduced to 1,2,3-trihydroxybenzene by catalytic hydrogenation and acid catalyzed hydrolysis.

15 45. The method of Claim 44, wherein the catalytic hydrogenation uses Rh/Al<sub>2</sub>O<sub>3</sub> as the catalyst.

46. A method for the production of 1,2,3-trihydroxybenzene and derivatives thereof from a carbon source, comprising the steps of:

- a) converting the carbon source to *myo*-2-inosose with a recombinant microbe;
- 20 b) converting the *myo*-2-inosose to 1,2,3,4-tetrahydroxybenzene by acid catalyzed dehydration; and
- c) reducing the 1,2,3,4-tetrahydroxybenzene to 1,2,3-trihydroxybenzene.

47. The method of Claim 46, wherein the recombinant microbe comprises  
25 the genes encoding for *myo*-inositol-1-phosphate synthase and inositol dehydrogenase.

- 29 -

48. The method of Claim 47, wherein the gene encoding for *myo*-inositol-1-phosphate synthase is a *Saccharomyces cerevisiae* INO1 gene.

49. The method of Claim 48, wherein the INO1 gene is located on a plasmid in the recombinant microbe.

5. 50. The method of Claim 49, wherein the plasmid is pAD2.28A.

51. The method of Claim 47, wherein the gene encoding for inositol dehydrogenase is an *iolG* gene.

52. The method of Claim 51, wherein the *iolG* gene is a *Bacillus subtilis* *iolG* gene.

10 53. The method of Claim 51, wherein the *iolG* gene is located on a plasmid in the recombinant microbe.

54. The method of Claim 53, wherein the plasmid is pAD2.28A.

55. The method of Claim 46, wherein the recombinant microbe is JWF1/pAD2.28A.

15 56. The method of Claim 34, wherein the 1,2,3,4-tetrahydroxybenzene is converted to 1,2,3-trihydroxybenzene by catalytic hydrogenation and acid catalyzed hydrolysis.

57. The method of Claim 56, wherein the catalytic hydrogenation uses Rh/Al<sub>2</sub>O<sub>3</sub> as the catalyst.

add a1 > add B2 >